

Remarks

Claims 20-39 are pending, and claims 20-39 stand rejected. The Applicants respectfully traverse the rejection and request allowance of claims 20-39.

§ 112 Claim Rejections

The Examiner rejected claims 20-39 under 35 U.S.C. § 112 as being indefinite. This is the same rejection the Examiner provided in the May 21, 2003 Office action. The Applicants will try to clarify claims 20 and 30 to the Examiner for a second time, and remind the Examiner that the claims are to be construed by one skilled in the art.

Claim 20 includes:

a controller configured to receive said hydrocarbon flow rate signal and said steam flow rate signal, to receive an estimated carbon content factor, said estimated carbon content factor being based on at least one potential constituent of said hydrocarbon feedstock, to process said mass flow rate of said hydrocarbon feedstock and said estimated carbon content factor to determine an estimated carbon content of said hydrocarbon feedstock, to receive a carbon-to-steam ratio for said hydrogen production system, and to process said estimated carbon content of said hydrocarbon feedstock, said flow rate of said steam, and said carbon-to-steam ratio to control at least one of said flow rate of said steam and said flow rate of said hydrocarbon feedstock.

The Examiner first questions what structure receives the estimated carbon content factor or the carbon-to-steam ratio. To answer the Examiner, the controller is the structure that receives the estimated carbon content factor and the carbon-to-steam ratio. We do not have to specify a separate structure, other than the controller, that receives the estimated carbon content factor and the carbon-to-steam ratio for claim 20 to be definite under § 112. A standard for definiteness is whether "the claims at issue are sufficiently precise to permit a potential competitor to determine whether or not he is infringing." *Exxon Research and Engineering Co. v. United States*, 60 USPQ2d 1272, 1276 (CA FC 2001)(citing *United Carbon Co. v. Binney & Smith Co.*, 317 U.S. 228, 236 (1942)). The Applicants submit that a competitor would be able to determine whether or not they have a controller that receives an estimated carbon content factor and a carbon-to-steam ratio.

The Examiner next questions what structure processes the mass flow rate in claim 20. To answer the Examiner, the controller is the structure that processes the mass flow rate, and the

Applicants do not have to provide a separate structure that processes the mass flow rate to be definite under § 112. Once again, a competitor would be able to determine whether or not they have a controller that processes a mass flow rate.

The Examiner next questions what structures interconnect with the flowmeters. To answer the Examiner, the controller is the structure that connects to the flowmeters. Because the controller receives a hydrocarbon flow rate signal, one skilled in the art will understand that the controller is connected in some manner to the first flowmeter. Similarly, because the controller receives a steam flow rate signal, one skilled in the art will understand that the controller is connected in some manner to the second flowmeter. Thus, it is clear that the controller connects with the flowmeters.

The Applicants previously responded to this same rejection in the May 21, 2003 Office action with similar remarks, and the Examiner replied to the Applicant's previous remarks on pages 5 and 6 of this Office action. The Examiner states that "[i]t is not clear how the controller is performing all of the claimed functions" and thus, claim 20 is indefinite. These comments by the Examiner do not ask further questions for clarification, but merely dismiss the last paragraph of claim 20 as being unclear. The Applicants have again answered all of the Examiner's questions, and submit that claim 20 is clear to one skilled in the art. If the Examiner has further questions on claim 20, the Applicants will try to assist the Examiner. However, a rubber-stamp of the same § 112 rejection will not further prosecution of this application as the Applicants have answered the Examiner's questions twice.

Based on these remarks, the Applicants submit that claim 20 is definite. Claim 30 is definite for similar reasons.

The Examiner also questions whether "a mass of carbon" is included in "the estimated carbon content factor" in claims 21 and 22. To answer the Examiner, the mass of carbon for a constituent of the hydrocarbon feedstock may be one factor used to determine or define the estimated carbon content factor. The Applicants previously responded to this same rejection in the May 21, 2003 Office action with similar remarks, and the Examiner replied on page 6 of this Office action to the Applicant's previous remarks. On page 6 of the Office action, the Examiner states that claims 21 and 22 are indefinite because the claimed language (i.e., "mass of carbon") may or may not be included in "the estimated carbon content factor". The Applicants totally disagree. The estimated carbon content factor may depend on many different factors. One factor

may be the mass of carbon in the hydrocarbon feedstock, as provided in claims 21 and 22. The Patent Laws provide for dependent claims for this very reason. The Applicants may claim one or more factors that make up the estimated carbon content factors in dependent claims, so that the independent claim is not limited to those factors. Thus, it is entirely proper to claim one factor used to determine the estimated carbon content factor, as in dependent claims 21 and 22.

Based on the above remarks, the Applicants submit that claims 20-39 are definite under § 112.

§ 102 Claim Rejections

The Examiner rejected claims 20-25, 28-35, 38, and 39 under 35 U.S.C. § 102 as anticipated by U.S. Patent number 5,458,808 (Suggitt). This is the same rejection the Examiner provided in the May 21, 2003 Office action. The Applicants will again attempt to explain the distinguishing features between the claims of the pending application and Suggitt.

First, Suggitt describes a totally different process for producing hydrogen than the claims of the pending application. There are three main processes for producing hydrogen: (1) Steam reforming, (2) Auto-Thermal Reforming, and (3) Partial Oxidation. The pending application describes producing hydrogen using the steam reformation process, wherein Suggitt describes producing hydrogen using the partial oxidation process. The steam reformation process involves reacting steam with a hydrocarbon feedstock to produce hydrogen. Because steam is a reactant, the carbon-to-steam ratio is important in claims 20 and 30, as the carbon-to-steam ratio between the hydrocarbon feedstock and the steam needs to be controlled in order for the steam reformation process to be most efficient.

The partial oxidation process, on the other hand, does not use steam to react with a hydrocarbon feedstock. One skilled in the art would not be concerned with the carbon-to-steam ratio for the partial oxidation process because steam is not a reactant. Steam is used in Suggitt as a cooling agent, and is not a reactive agent in the process to produce hydrogen.

Second, Suggitt does not teach all the claim limitations described in claim 20 of the pending application. Claim 20 describes a controller configured to "*receive an estimated carbon content factor*" and "*process said mass flow rate of said hydrocarbon feedstock and said estimated carbon content factor to determine an estimated carbon content of said hydrocarbon feedstock*". Suggitt does not teach receiving an estimated carbon content factor or determining

an estimated carbon content of a hydrocarbon feedstock based on the estimated carbon content factor. The Examiner states on page 6 of the Office action that Suggitt does not specifically teach receiving an estimated carbon content factor or determining an estimated carbon content of the hydrocarbon feedstock, but does determine a heat content of a hydrocarbon feedstock.

Suggitt defines hydrocarbon heat content as "the heat evolved after complete combustion of paraffinic, olefinic and aromatic components, and after any water has condensed to the liquid state". (See Suggitt, column 1, lines 29-33). Further, Suggitt describes determining a heat content of the feed-gas *based on nuclear magnetic resonance*. (see Suggitt, column 9, lines 61-64; column 10, lines 63-66). Conversely, claim 20 describes an estimated carbon content of the hydrocarbon feedstock *based on an estimated carbon content factor and a mass flow rate of the feedstock*. Determining an estimated carbon content involves determining *an amount of carbon* present in the hydrocarbon feedstock, not the heat evolved from combustion of the hydrocarbon feedstock as in Suggitt. The heat evolved from combustion of the hydrocarbon feedstock does not correspond to the amount of carbon in present in the hydrocarbon feedstock. Because Suggitt does not determine an estimated carbon content of a hydrocarbon feedstock *based on an estimated carbon content factor and a mass flow rate of the feedstock*, Suggitt does not teach a controller that determines an estimated carbon content of a hydrocarbon feedstock as described in claim 20.

Claim 20 also describes a controller configured to *"receive a carbon-to-steam ratio for said hydrogen production system, and to process said estimated carbon content of said hydrocarbon feedstock, said flow rate of said steam, and said carbon-to-steam ratio to control at least one of said flow rate of said steam and said flow rate of said hydrocarbon feedstock."*

Suggitt does not teach receiving a carbon-to-steam ratio or controlling based on a carbon-to-steam ratio. As previously stated, the partial oxidation process described in Suggitt does not use steam to react with a hydrocarbon feedstock. One skilled in the art would not be concerned with the carbon-to-steam ratio for the partial oxidation process because steam is not a reactant. Steam is used in Suggitt as a cooling agent, and is not a reactive agent in the process to produce hydrogen. Thus, one skilled in the art would have no purpose in determining a carbon-to-steam ratio for the partial oxidation process taught in Suggitt.

Claim 20 also describes *"a second flowmeter configured to measure a flow rate of steam*

from a steam supply and to produce a steam flow rate signal representing said flow rate of said steam". Suggitt does not teach a second flowmeter as described in claim 20. In rejecting the second flowmeter, the Examiner cited the flowmeter 38 in Suggitt. (see Suggitt, FIG. 2). The Examiner is mistaken in this rejection. The flowmeter 38 in Suggitt does not measure steam, but is used to measure a supplemental gas stream 46. (see Suggitt, column 13, lines 20-43). The supplemental gas stream is used to raise the hydrocarbon heat content of the feed-gas. Steam cannot raise the hydrocarbon heat content of the feed-gas, as a carbon-based gas is needed. Consequently, the Examiner cannot say that the supplemental gas stream 46 comprises steam. Therefore, the Examiner cannot reject the second flowmeter in claim 20 based on the flowmeter 38 taught in Suggitt.

Suggitt does not teach measuring a flow rate of steam. As previously stated, the partial oxidation process in Suggitt does not use steam as a reactant.

Based on the above remarks, the Applicants submit that claim 20 is new and non-obvious in view of Suggitt. The above remarks apply equally to claim 30 and dependent claims 21-25, 28-29, 31-35, 38, and 39.

§ 103 Claim Rejections

The Examiner rejected claims 26, 27, 36, and 37 under 35 U.S.C. § 103 in view of Suggitt and U.S. Patent number 5,259,239 (Gaisford). The remarks provided above apply equally to this rejection. The Applicants submit that claims 26, 27, 36, and 37 are novel and non-obvious over Suggitt, Gaisford, and any combination thereof as being dependent on a novel and non-obvious independent claim.

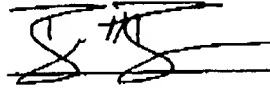
Conclusion

Based on the above remarks, the Applicants submit that independent claims 20 and 30 are allowable. The dependent claims are allowable as being dependent on an allowable independent claim. There may be additional reasons in support of patentability, but such reasons are omitted in the interests of brevity. The Applicants respectfully request allowance of claims 20-39.

Any fees may be charged to deposit account 502622.

Respectfully submitted,

Date: 1-27-04



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